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A lid for a container

Field of invention

This invention relates to a lid for a container, the lid having a cover with deformable dimensions, and a kit of parts comprising the lid and a container.

Background

Existing portable containers, such as travel mugs for containing liquids, have lids that are suitable only for fitting a container of one size.

An exemplary existing travel mug is shown in Figures 1a and 1b. The travel mug 100 has a container 102 and a lid 104. The container 102 has a lip 106. The lid 104 is forced to flex outward to fit over the lip 106, and then tends towards its original shape to grip the lip 106 of the container 102 to seal the container 102. The travel mug 100 has a drinking spout 108 through which a user can consume the liquid inside the container 102. The spout 108 can be sealed by a tongue 110, which can also be docked in a blank hole 112 corresponding to the spot hole 108. The container 102 and lid 104 of the mug 100 are dimensioned precisely to generate the interference fit of the lid 104 over the lip 106. This is problematic because it means that the lid 104 could not also be used with containers of other sizes.

Figure 2 shows an existing mug 200 having a container 202 and a flexible lid 204. The lid 204 has a tab 206 that a user can pull to stretch the flexible lid 204 over the outer walls of the container 202. Upon release, the lid 204 will snap back towards its original size so as to seal the container. The container 202 and flexible lid 204 are sized such that the lid 204 generates a good seal due to

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the tension of the lid 204 across the opening of the container 202. If the container were larger, the lid 202 would stretch insufficiently to cover the opening, and if it were smaller the lid 204 would not form a tight seal. Again therefore, it would not be possible to use the lid 204 with containers of other sizes. ✓

Intro (4/6)

An improvised solution is desired.

Summary of invention

According to one aspect of the present invention, there is provided a lid for a container, the lid comprising: a resiliently deformable cover; an integral expander arranged to deform the cover; and means for selectively expanding and retracting the expander, wherein, upon expansion or retraction of the expander, the expander is arranged to deform the dimensions of the cover, in use to fit the container.

The expander bears against the cover so as to stretch the cover (as it is deformable) to the required size. ✓ The cover is also resilient, meaning that it tends towards adapting its undeformed configurations. Therefore, when the expander is retracted, the cover will also retract back towards its undeformed position. In this way, the expansion and retraction of the expander (which is controllable) controls the dimensions of the cover meaning that a user can expand the cover to a certain size that is suitable for a given container.

Therefore, the lid can be used with a variety of different sized containers. ✓ The expander is integral to the lid, which is particularly advantageous because the dimensions of the cover can be deformed to, and kept at, a certain size that is suitable for a given container. This does not require continued input from a user

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because the expander is an integral part of the lid, and so the lid will not return to its undeformed size. This is in contrast to existing lids, such as the lid of Figure 2, which will snap back to its original size without a continued external force provided by a user. ✓

The term “selectively” in reference to the means for selectively expanding and retracting the expander is used herein to mean that a user can control this means to expand or retract the expander such that the cover is deformed to a user selected size.

Preferably, the lid, cover, and expander are circular such that the lid is suitable for circular cups, mugs, bowls and other circular containers. However, these components may instead be other shapes, such as rectangular, to seal other shaped containers. The term “radial” used herein means the direction towards or away from the centre of an object and need not be limited only to circular or spherical objects.

Preferably, the expander is located concentrically within the cover and arranged to deform the cover by exerting a radial force on the cover. Therefore, the force exerted by the expander will act to expand the cover more or less evenly in different directions, in contrast to existing lids such as the lid shown in Figure 2, where a user pulling on the tab will cause the lid to deform unevenly. ✓

Preferably, the means for selectively expanding and retracting the expander is located centrally within the expander. Therefore, the means force that is needed to deform the cover is exerted from the centre of the lid in contrast to existing lids, such as the lid shown in Figure 2 where the force is generated at the end of

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the lid. A central force provides for more even expansion of the lid in different directions.

Preferably, the expander comprises two or more inner partial walls arranged to be engaged by the means for selectively expanding and retracting the expander.

The term "partial wall" is used here to mean a wall that the walls do not entirely surround the means for selectively expanding and retracting the expander.

There is therefore at least one gap between the first and second (and optionally more) partial walls. The gaps allow the walls to expand or retract outwards and inwards.

Preferably, each inner partial wall is connected to an adjacent inner partial wall. Preferably, the connection is provided at a bottom edge of each inner wall. This connection provides additional stability to the expander.

Preferably, the expander comprises two or more outer partial walls arranged to engage the cover. The term "partial walls" is used here in the same way as above. The two or more walls are arranged with gaps between so that they do form a closed wall around the expander. The gaps allow the walls to expand or retract outwards and inwards.

Preferably, the inner partial walls are connected to the outer partial walls by radial struts. The struts enable transfer of force from the inner walls to the outer walls. Therefore, a force exerted on the inner walls (by the means for selectively expanding and retracting the expander) is transferred to the outer walls via the struts, thereby to exert a force to deform the cover. This arrangement enables even radial expansion for a circular lid.

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Preferably, the means for selectively expanding and retracting the expander comprises a tapered screw adapted to be fitted within a tapered bore of the expander. As the tapered screw is screwed into the tapered bore (so the thicker part of the screw occupies the bore), the screw exerts an outward force on the bore. This outward force provides an expanding force on the expander. If the screw is unscrewed (so the thinner part of the screw occupies the bore) the expander retracts under the resilient force of the cover. A screw provides an easily user-actuable means for expanding or retracting the expander.

Preferably, the lid comprises an integral screwdriver for tightening or loosening the tapered screw within the tapered bore. The integral screwdriver is rotated by a user one way to tighten, and another way to loosen, the screw within the bore. The screwdriver therefore provides an in-built mechanism for a user to expand or retract the expander to the required size without the need for additional tools.

Alternatively, the means for selectively expanding and retracting the expander comprises an inflatable bladder and a sealable valve. The bladder is filled with air so that it expands and exerts an outward force on the expander, or the bladder is deflated so that it ceases to exert an outward force and the expander retracts under the force of the resilient cover. The valve prevents air from entering or leaving the bladder once it has been inflated to provide the desired expansion; in this way the expander is held at a size suitable for a particular container.

Preferably, the lid comprises a pump for drawing air into or out of the bladder. The pump may be provided with a button for actuating the pump to inflate or deflate the bladder to provide a user selectable expansion of the expander.

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Preferably, the lid comprises a flange extending radially outward from the cover. The flange extends in the same plane as the lid such that when the lid is placed on a container, such as a mug, the flange abuts the walls of the container to provide a seal with the walls of the container.

Preferably, the expander is arranged to engage a wall of the cover thereby to deform the dimensions of the flexible cover. In this way, the force exerted by the expander on the cover acts to deform the cover, as well as force the walls into contact with a container (when the walls are arranged to contact the interior of the container to seal the container).

Preferably, the wall of the cover depends from an inner part of the flange. Or, in other words, the flange extends from an upper part of the wall. This means that, when the wall of the cover is fitted within a container and the flange abuts the top of the container walls, the cover wall and the flange essentially form a T-shaped junction against the walls of the container, with the wall of the cover arranged to engage the interior of the container and the flange arranged to seal the top of the walls of the container. This provides an improved seal.

Preferably, the lid comprises an opening for accessing the means for selectively expanding and retracting the expander. For example, the opening may reveal the head of the tapered screw such that a user can easily access the screw to tighten it with a screwdriver (if needed) or the valve of the bladder for ease of inflating or deflating the bladder.

Preferably, the lid comprises a cap for closing the opening. The cap prevents accidental actuation of the means for selecting expanding or retracting the

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expander. The cap may additional information (such as about the contents of the container) or a trade mark.

Preferably, in use the cover is expanded to exceed the size of an opening of the container, and then retracted such that the cover engages an outer surface of the container to seal the container. This cover is resilient so the engagement between the cover and the outer surface of the container is provided by the elastic force of the cover. ✓

Alternatively, in use the cover is expanded within an opening of the container such that the cover engages an inner surface of the container to seal the container. In this case, the engagement between the cover and the inner surface of the container is provided by the force of the means for expanding the expander against the inner walls of the container.

Preferably, the cover ✓ comprises a sealable aperture for enabling access or consumption of the contents of the container. For example. The lid may comprise a drinking spout for drinking liquids from the container, or if the container is a food container, a user may be able to reach into the container to access its contents via the aperture. In this way, a user need not remove the lid from the container in order to access its contents.

Preferably, the lid comprises a nozzle coupled to the aperture. The nozzle provides a spout for drinking or pouring a liquid contained within the container.

Preferably, the nozzle is stowable in the lid thereby to seal the aperture. For example, the nozzle is operable to flip down into a stowed position on the lid, wherein in the stowed position the nozzle is sealed.

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Preferably, the nozzle is coupled to the integral screwdriver. In this way, a user can rotate the nozzle and the rotational force will be transferred to the screwdriver to tighten or loosen the means tapered screw which in turn expands or retracts the expander to secure or release the lid from the container.

Therefore, the nozzle provides a convenient handle for a user to operate the lid. Alternatively, the screwdriver may be provided with bumps and dips around its circumference to assist a user in gripping and rotating the screwdriver.

Preferably, the cover is made from silicone. Silicone is deformable and resilient and so provides the necessary mechanical properties for the cover. It is also waterproof so prevents liquids from escaping the container even if the container is held upside down.

According to another aspect of the present invention there is provided a kit of parts comprising the lid as aforementioned and a container. The deformable cover of the lid can be controllably deformed by a user such that the cover is deformed to, and stays at, the dimensions suitable for the container.

Preferably, the container is a mug for containing liquids. The container is therefore waterproof and preferably is provided with a circular opening to be sealed by the lid.

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The invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1a is a perspective view of an existing travel mug with a lid in an unsealed configuration;

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Figure 1b is a perspective view of the travel mug of Figure 1a with the lid in a sealed configuration;

Figure 2 is a perspective view of an existing drinking vessel;

Figures 3a and 3b are exploded views of a first embodiment of the lid of this invention, the lid components being shown in perspective in Figure 3a and in plan in Figure 3b; and

Figures 4a to 4c are perspective views of a second embodiment of the lid being fitted to a container.

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Specific description

A first embodiment of the lid of this invention is shown in Figures 3a and 3b. The lid 300 comprises a deformable cover 302. The cover is made from silicone and its flexible and resilient. The cover is flexible in the sense that it can be deformed out of its original shape, but resilient in the sense that it naturally tends back to its original shape.

The lid 300 also comprises an expander 304. The expander 304 comprises four inner partial walls 305a with gaps between them to allow expansion and retraction, and outer partial walls 305b also having gaps between to allow expansion and retraction. The inner and outer partial walls are connected via radial struts 305c which transfer a force applied to one set of walls to the other set (for example, an expansive force applied to the inner walls is transferred to the outer walls so that they expand, and a retractive force applied to the outer walls is transferred to retract the inner walls).

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The expander 304 is adapted to sit concentrically within the cover 302 such that the outer walls 305b contact the inside surface of a circular wall 303 of the cover 302. Therefore, when the expander 304 expands, the outer walls 305b bear against the wall 303 of the cover 302 thereby to stretch the cover 302 to the desired size to fit a container. The expander 304 is integral with the lid so that when it is expanded to certain size, the lid will remain at that size even when the force that causes the expander to expand is removed.

In the centre of the expander is a tapered bore 305d. The bore 305d is adapted to receive a tapered screw 306 therethrough. The bore 305d and screw 306 have complementary screw threads. The lid 300 also comprises an integral screwdriver 308 which has a central part for engaging crossed slots on the head of the tapered screw 306 such that rotation of the screwdriver 308 causes the screw 306 to be tightened or loosened.

Upon tightening the screw, the thicker part of the tapered screw moves into the bore thereby to exert an outward force on the bore which acts to expand the expander and thus in use the cover. Upon loosening the screw, the thicker part of the tapered screw moved out of the bore in favour of the thinner part, thus the outward force is removed and, under the resilient force of the cover which will tend to resist the stretch, the expander 304 will retract. The screw will maintain its progress through the bore even when the rotational force on the screwdriver is removed, thereby to hold the expander in its expanded position against the resilient cover.

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The cover 302 has an opening through which a user can access the screwdriver 308 to tighten or loosen the screw. This opening is closed by a cap 310 which prevents accidental actuation of the screwdriver.

In use, the cover is expanded by a user actuating the screwdriver to controllably expand the expander, and thus the cover, to a size slightly larger than the opening of a container. The cover is then placed over the opening of the container and the screwdriver is actuated in the reverse direction to cause the expanded cover to retract under the resilient force of the cover such that the cover engages the external surface of the container.

A second embodiment of the lid of this invention is shown in Figures 4a to 4c.

The lid 400 in this embodiment comprises a flange protruding radially outward from the top of the wall 303 of the cover of the lid, such that the wall 303 depends downwardly from an inner part (i.e. radially inner part) of the flange.

The lid 400 is assembled with a container 404 by sitting the lid on top of the container 404, as indicated by the arrow in Figure 4a, such that the wall 303 of the cover is fitted within the opening of the container 404 and the flange 402 abuts the top of the walls of the container 404, which in this example is a mug.

The screwdriver 308 is then rotated, as indicated by the arrows in Figure 4b, to expand the expander (not shown) such that the wall 303 of the cover is forced radially outwards to engage the inner surface of the container 404 thereby to seal the container by the lid 400. The flange 402 and the wall 303 provide a seal against the top and inner parts of the walls of the container respectively.

In a third embodiment of the lid of this invention (not shown in the figures) the tapered screw and tapered bore are replaced with an inflatable bladder. The

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inflatable bladder as a valve to control the inflow of air into the bladder to inflate the bladder, and the outflow of air to deflate the bladder.

When the bladder is inflated, the bladder exerts a radially outward force on the inner partial walls of the expander (in place of the screwing of the tapered screw) which forces the expander outwards to stretch the cover to a desired size to fit a particular container. The valve prevents the bladder from deflating so that the bladder stays inflated and thus maintains the lid at the expanded size without the need for an external input from a user.

Alternatives and modifications within the scope of the invention will be apparent to the person skilled in the art. For example, rather than using silicon, the deformable cover may instead be made from a different resilient and flexible material.

In addition, while the examples described above all depict a circular lid for a circular opening of a container, the invention could equally be implemented with non-circular containers. For example, the lid could be rectangular to fit a rectangular container. In this example, the inner partial walls of the expander could form an oval shape, such that an outward (i.e. radial) force causes the expanded expand further in one direction that in other directions, therefore provided an expansion that is adjustable to suit different sized rectangular containers.

Furthermore, the lid may be modified to include an opening through which a user can access the contents of the container. This opening may be provided with a nozzle or drinking spout, which may itself optionally be coupled to the

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screwdriver so that it provides a convenient handle by which a user can rotate the screwdriver.

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Claims

1. A lid for a container, the lid comprising:
 - a resiliently deformable cover;
 - an integral expander arranged to deform the cover; and
 - means for selectively expanding and retracting the expander,wherein, upon expansion or retraction of the expander, the expander is arranged to deform the dimensions of the cover, in use to fit the container.
- Claim 1 (10/22)
2. A lid according to Claim 1, wherein the expander is located concentrically within the cover and arranged to deform the cover by exerting a radial force on the cover.
 3. A lid according to Claim 1 or 2, wherein the means for selectively expanding and retracting the expander is located centrally within the expander.
 4. A lid according to any preceding claim, wherein the expander comprises two or more inner partial walls arranged to be engaged by the means for selectively expanding and retracting the expander.
 5. A lid according to Claim 4, wherein each inner partial wall is connected to an adjacent inner partial wall.

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6. A lid according to any preceding claim, wherein the expander comprises two or more outer partial walls arranged to engage the cover.
7. A lid according to Claim 4 or 5, and Claim 6, wherein the inner partial walls are connected to the outer partial walls by radial struts. ✓ ✓
8. A lid according to any preceding claim, wherein the means for selectively expanding and retracting the expander comprises a tapered screw adapted to be fitted within a tapered bore of the expander. ✓ ✓
9. A lid according to Claim 8, comprises an integral screwdriver for tightening or loosening the tapered screw within the tapered bore. ✓ ✓
10. A lid according to any of Claims 1 to 7, wherein the means for selectively expanding and retracting the expander comprises an inflatable bladder and a sealable valve. ✓
11. A lid according to Claim 10, comprising a pump for drawing air into or out of the bladder. ✓
12. A lid according to any preceding claim, comprising a flange extending radially outward from the cover. ✓ ✓

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13. A lid according to any preceding claim, wherein the expander is arranged to engage a wall of the cover thereby to deform the dimensions of the flexible cover.

14. A lid according to Claims 12 and 13, wherein the wall of the cover depends from an inner part of the flange.

15. A lid according to any preceding claim, wherein the lid comprises an opening for accessing the means for selectively expanding and retracting the expander.

16. A lid according to Claim 15, comprising a cap for closing the opening.

17. A lid according to any preceding claim, wherein in use the cover is expanded to exceed the size of an opening of the container, and then retracted such that the cover engages an outer surface of the container to seal the container.

18. A lid according to any of Claims 1 to 16, wherein in use the cover is expanded within an opening of the container such that the cover engages an inner surface of the container to seal the container.

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19. A lid according to any preceding claim, wherein the cover comprises a sealable aperture for enabling access or consumption of the contents of the container.
20. A lid according to Claim 19, comprising a nozzle coupled to the aperture.
21. A lid according to Claim 20, wherein the nozzle is stowable in the lid thereby to seal the aperture.
22. A lid according to 9 and 20 or 21, wherein the nozzle is coupled to the integral screwdriver.
23. A lid according to any preceding claim, wherein the cover is made from silicone.
24. A kit of parts comprising the lid of any preceding claim and a container.
25. A lid or kit of parts according to any preceding claim, wherein the container is a mug for containing liquids.

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Total Claims

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Abstract

A lid for a container

A lid 300 for a container has a resiliently deformable cover 302 and an integral expander 304 that is arranged to deform the cover 302. The lid 300 has means 306 for selectively expanding and retracting the expander 304, such that when the expander 304 is expanded or retracted, it deforms the dimensions of the cover 302. Therefore, a user can adjust the size of the lid to suit a variety of containers. There is also provided a kit of parts comprising the lid 300 and a container.

[Figure 3a]

Abstract

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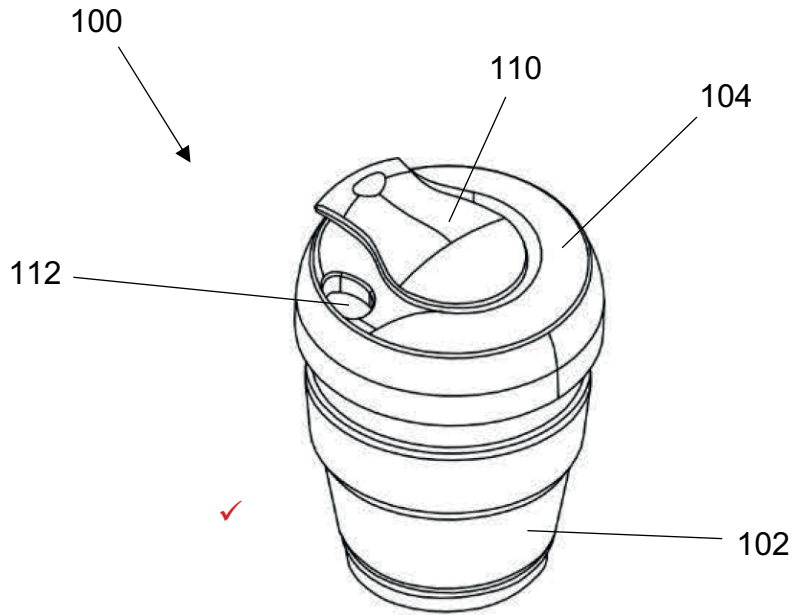


Figure 1a

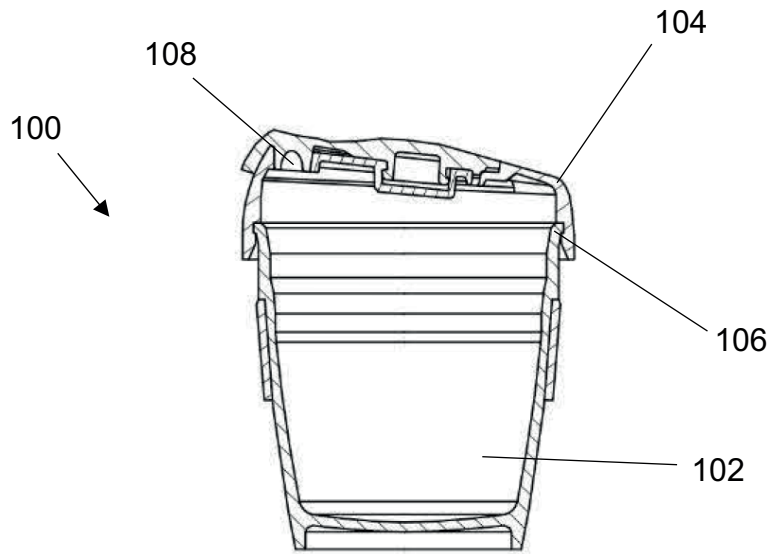


Figure 1b

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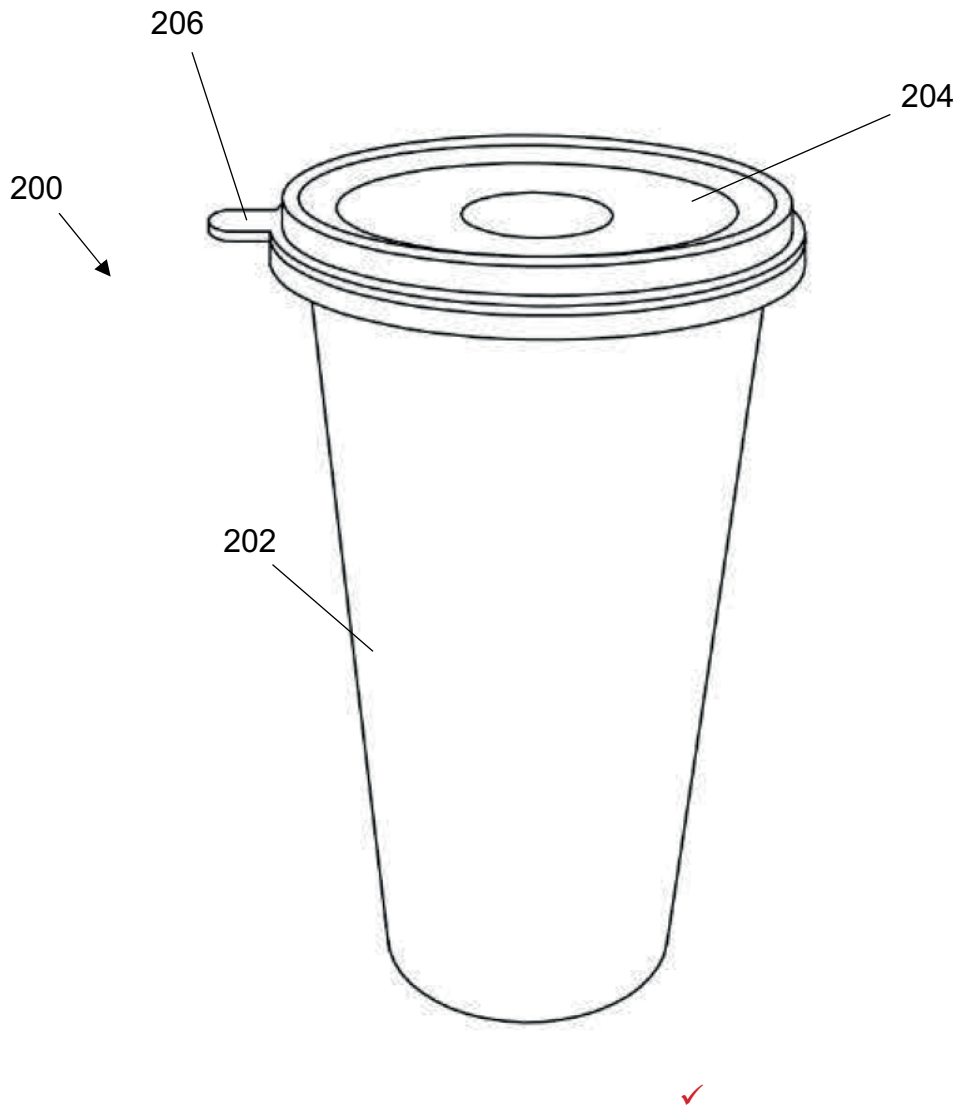
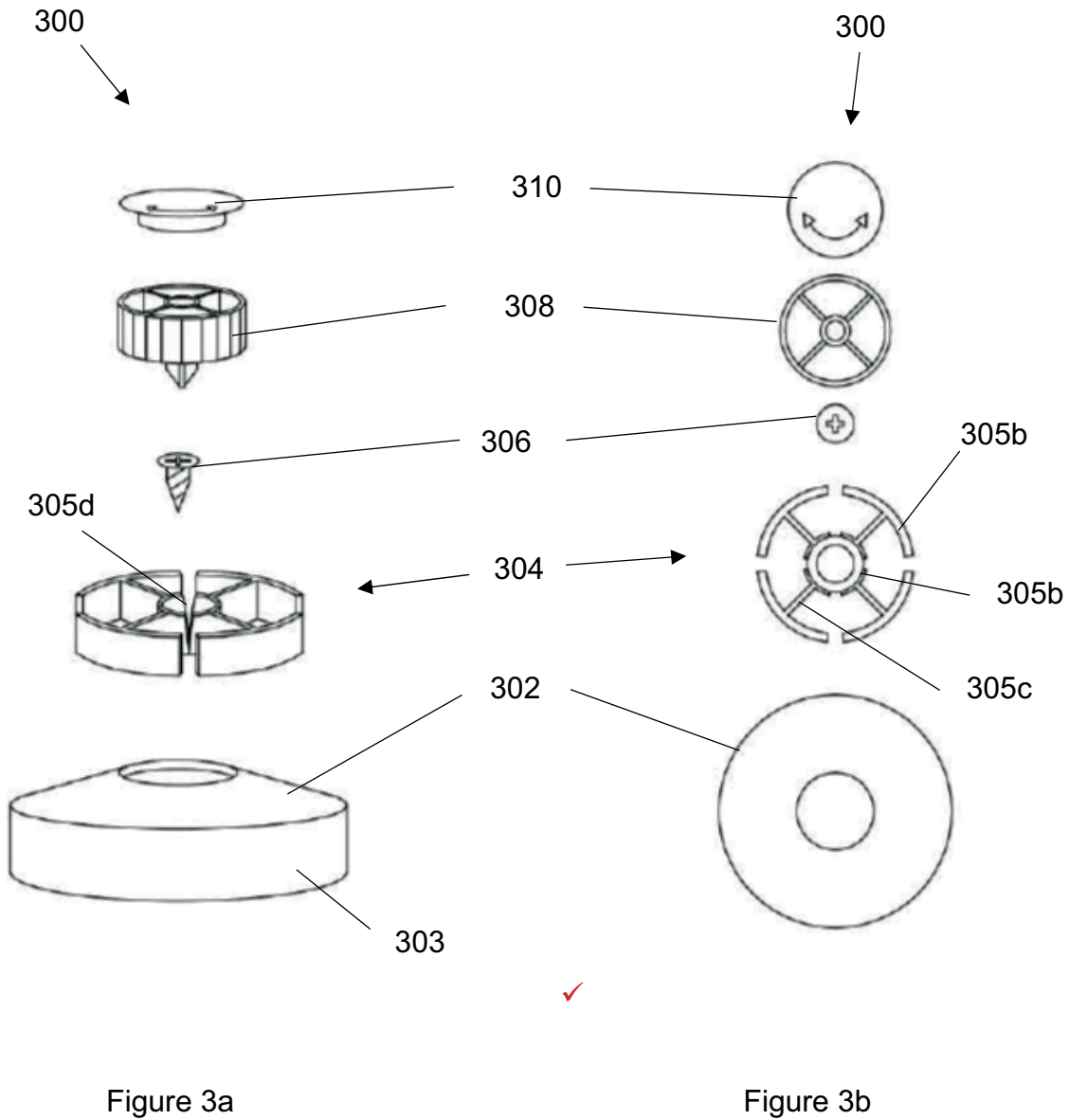


Figure 2

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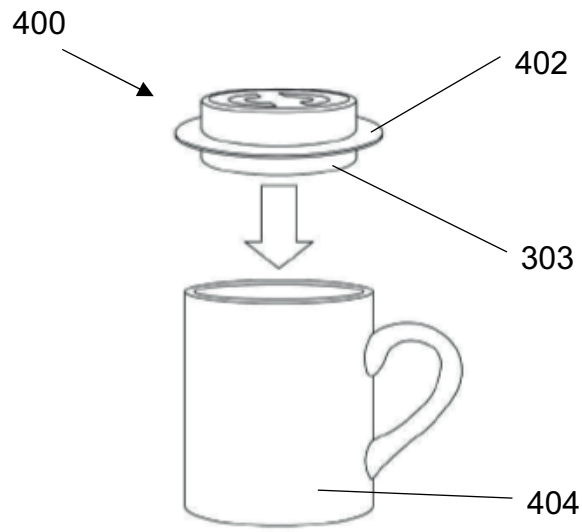


Figure 4a

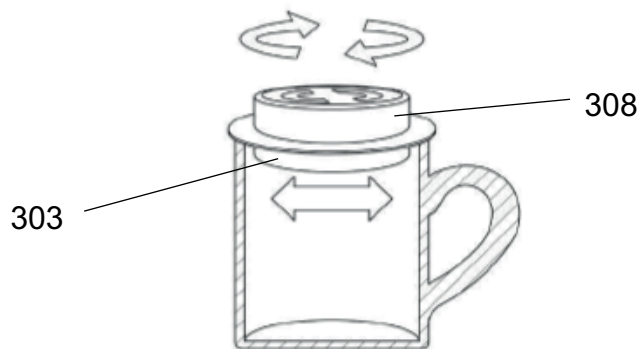


Figure 4b

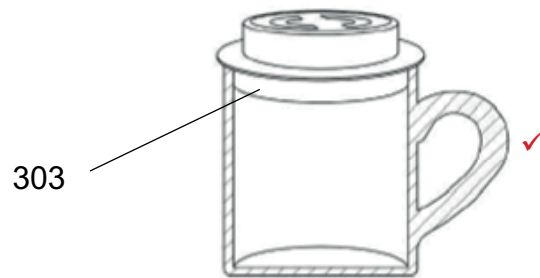


Figure 4c